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It may be shown that the condition that

$$lx + my + nz = 0 \dots\dots\dots (6) \text{ cuts } ayz + bxz + cxy = 0 \dots\dots\dots (7)$$

$$\text{in two straight lines including a right angle is } amn + bnl + clm = 0 \dots\dots\dots (8).$$

Comparing (5) and (6), $l = a(ax' - by' - cz')$, $m = b(-ax' + by' - cz')$, $n = c(-ax' - by' + cz')$, and (8) becomes

$$abc\{a^2x'^2 - (by' - cz')^2 + b^2y'^2 - (cz' - ax')^2 + c^2z'^2 - (ax' - by')^2\} = 0 \dots\dots\dots (9),$$

an identity by aid of (3).

Also solved by *HENRY HEATON* and *J. SCHEFFER*.

PROBLEMS.

65. Proposed by *I. J. SCHWATT*, Ph. D., Professor of Mathematics, University of Pennsylvania, Philadelphia, Pennsylvania.

Prove in a pure geometrical way the following:

The axes of the ellipse isogonal to Lemoine's line with respect to a triangle (Steiner's ellipse) are parallel to Simson's lines belonging to the extremities of Brocard's Diameter.

66. Proposed by *WILLIAM HOOVER*, A. M., Ph. D., Professor of Mathematics and Astronomy, Ohio University, Athens, Ohio.

The locus of points whose polars with respect to a given parabola touch the circle of curvature at the vertex is an equilateral hyperbola.

MECHANICS.

Conducted by *B. F. FINKEL*, Springfield, Mo. All contributions to this department should be sent to him.

SOLUTIONS OF PROBLEMS.

32. Proposed by *OTTO CLAYTON*, A. B., Fowler, Indiana.

The wheel of a wind pump has 60 fans, each turned at an angle of 45° to the direction of the axis, and each having 150 square inches exposed to the wind. If the wind blows with a velocity of V and the wheel rotates with velocity ω , what is the component of force or pressure along the axis if it is turned at an angle α to the direction of the wind assuming the resistance of the wheel in turning to be R ?

Solution by *G. B. M. ZERR*, A. M., Ph. D., Texarkana, Arkansas-Texas.

Let A = projecting area of fans exposed to the wind, in square feet,

V = velocity of wind in feet per second,

H = horse power of pump,

R = extreme radius of fans in feet,